Please amend the specification as follows:

Please replace the paragraph on page 7, lines 14-28, with the following amended paragraph:

The first airport 82 serves as the support and maintenance base for the airplane ~~35~~ 35″ shown providing coverage to a predetermined geographic area by executing a flight pattern 86 having a pattern center 88 that is generally equidistant from both of the airports 82, 84. The first airport 82 includes staffed mechanics for servicing the airplane ~~35~~ 35″ between missions, as well as air traffic control facilities such as the airplane operations center 37 and the weather center 38 shown in FIG. 1. The second airport 84 serves as the support and maintenance base for a second system airplane, such as an airplane ~~35~~ 35′, that alternates with the airplane ~~35~~ 35″ in executing the flight pattern 86 to provide the predetermined geographic area with uninterrupted cellular coverage. In addition, the second airport 84 may also serve as the support and maintenance database for an additional airplane, such as an airplane ~~35~~ 35″, that may be included in the system 10 as a backup airplane to execute the flight pattern 86 if one or more of the airplanes ~~35~~ 35′, ~~35~~ 35″ both become unavailable due to adverse weather conditions or maintenance problems, as further discussed below.

Please replace the paragraph on page 7, lines 29-34 to page 8, lines 1-9, with the following amended paragraph:

Although, the airport 82 is described as serving as the support and maintenance database for the airplane ~~35~~ 35″, and the airport ~~82~~ 84 is described as serving as the support and maintenance database for the airplane ~~35~~ 35″, in actuality any of the airplanes ~~35~~ 35″, ~~35~~ 35′, 35 can utilize either of the airports 82, 84 for maintenance and support needs. Further, one of the airports 82, 84 may serve as a primary maintenance and support base, while the other of the two airports serve as an auxiliary base and may provide more limited services, such as hangar and fueling services and/or redundant airplane operations center support. In such a configuration,

the airport serving as the auxiliary base may only be used during certain times, such as during adverse weather conditions, when the planes cannot land at the airport serving as the primary maintenance and support base, or when the airport serving as the primary maintenance and support base experiences technical difficulties such as a power outage. The specific services provided by each of the airports 82, 84 will be determined based on specific system needs and operating conditions.

Please replace the paragraph on page 8, lines 10-20, with the following amended paragraph:

In accordance with the first embodiment, each of the airplanes ~~35~~ <u>35'</u>, ~~35~~ <u>35"</u> is an airplane designed to fly at low altitudes, such as a Pilatus Model PC12 airplane, which is capable of flying daily missions of up to 8 hours in duration each. The airplane ~~35~~ <u>35'</u> takes over execution of the flight path 86 for the airplane ~~35~~ <u>35"</u> at the end of the mission of the airplane ~~35~~ <u>35"</u> in a manner discussed below. Likewise, the airplane ~~35~~ <u>35"</u> takes over execution of the flight path 86 for the airplane ~~35~~ <u>35'</u> at the end of the mission of the airplane 35'. If one of the airplanes, such as the airplane ~~35~~ <u>35'</u> as shown in FIG. 1, cannot take off from an airport, such as the airport 84, at which it is located due to inclement weather in the vicinity of the airport 84 or due to maintenance-related problems, the airplane ~~35~~ <u>35"</u> may instead be used to take over flight pattern execution from the airplane ~~35~~ <u>35'</u>.

Please replace the paragraph on page 8, lines 21-34 to page 9, lines 1-2 with the following amended paragraph:

Still referring to FIG. 3, the airports 82, 84 are staged a predetermined distance apart from each other, with the predetermined distance preferably corresponding to a glide-down distance of a low altitude small engine plane. The above-discussed 400 mile separation between the airports 82, 84 corresponds to the 200 mile glide down distance of the commercially produced

Pilatus PC12, which is designed to operate at between 30,000 and 45,000 feet. However, the actual distance will vary depending on the type and model of planes used to execute the flight pattern, as well as local weather patterns, terrain, and customer coverage variations, and may range from, for example, 15,000 – 60,000 feet. Therefore, if a plane executing the flight pattern 86 develops engine problems, it can safely glide down to either of the airports for service. The separation distance also minimizes the probability that a single storm, which rarely covers an entire 400-mile radius geographic area, will prevent take-offs and landings at both airports 82, 84. Further, if a storm moved into the area of the airport 84 and a backup airplane such as the airplane ~~35~~ 35″ was not available at the airport 82, the airplane 35 could alternatively be ferried to the airport 82 to support a subsequent mission.

Please replace the paragraph on page 9, lines 3-14 with the following amended paragraph:

Therefore, the configuration 80 of the first preferred embodiment facilitates dynamic mission planning for airplanes that provide repeater coverage to a geographic area for the cellular communications system 10 in a manner that minimizes system down time due to adverse weather conditions such as thunderstorms and due to airplane mechanical failure. Fly-up and fly-down time for each of the planes 35, ~~35~~ 35′, ~~35~~ 35″ is more flexible, as one or more planes is always ready to take over execution of the flight pattern 86. Further flexibility may be provided to the system 10 in accordance with the above preferred embodiment by making airplanes in addition to the airplanes 35, ~~35~~ 35′, ~~35~~ 35″ available in the configuration 80, or by making airports available in addition to the airports 82, 84 to help further avoid system downtime due to weather problems and to provide further system redundancy.

Please replace the paragraph on page 9, lines 15-26 with the following amended paragraph:

FIGs. 4 and 5 show beam patterns and corresponding beam footprints of both a high altitude airborne cellular communications system 90 and a low altitude airborne cellular communications system 92, while FIG. 5 shows beam footprints 94, 96 corresponding to the respective beam footprints 90, 92, as well as a geographic area 98 requiring cellular coverage.

In a second preferred embodiment in accordance with the present invention, the beam pattern 92 and resulting beam footprint 96 are realized through simultaneous use of two commercially produced airplanes, such as the airplanes ~~35~~ <u>35'</u>, ~~35~~ <u>35"</u> shown in FIG. 3 and represented generally as shown in FIG. 4, while the high-altitude airborne cellular communications system beam pattern 90 and resulting footprint 94 are realized through use of a single high-altitude plane capable of executing a flight pattern at an altitude of more than 50,000 feet and represented generally in FIG. 4 at 100.

Please replace the paragraph on page 9, lines 27-34 to page 10, lines 1-7 with the following amended paragraph

The lower altitude airplanes ~~35~~ <u>35'</u>, ~~35~~ <u>35"</u> are less expensive than a high-altitude airplane would be if such a plane were available. Currently, although such a high altitude airplane has been proposed, no such high-altitude planes are in production. However, estimated start-up costs for such a plane would be between $30 million and $60 million. In addition, more stringent FAA requirements, including redundant oxygen systems, higher cabin burst pressures, and high altitude pilot training requirements, would have to be met. The airplanes ~~35~~ <u>35'</u>, ~~35~~ <u>35"</u> have more desirable performance parameters, such as ascent and descent time (approximately 30 minutes) and flight mission duration (4-6 hours), than would a high altitude airplane (estimated ascent/descent time of 1-2 hours; estimated flight mission duration of 20-40 hours). In addition, low altitude airplane missions are more flexible in that multiple contingency options, such as weather issues, airplane mechanical failure, and airport maintenance options, may be built into mission planning by the airplane operations center 37 to guard against system downtime due to airplane maintenance problems.

Please replace the paragraph on page 10, lines 8-18 with the following amended paragraph:

As shown in FIG. 5, the two airplanes ~~35~~ 35′, ~~35~~ 35″ are capable of providing a more accurate mission-specific footprint 96 that is more focused on the geographic area 98 than the high altitude airplane 100. The size and shape of such a footprint can be varied by varying the altitude of one or both of the airplanes ~~35~~ 35′, ~~35~~ 35″ to vary the beam pattern(s). Consequently, beam footprints may be shaped in, for example, a figure-8 type form as shown at 102 in FIG. 6 from beam patterns 104, or a box-type form as shown at 108 in FIG. 7 from beam patterns 106. Alternatively, as shown in FIG. 8, multiple planes may be used to form combination beam patterns tailored to a specific customer base. For example, if three planes such as the planes 35, ~~35~~ 35′, ~~35~~ 35″ were utilized, a triangular-type footprint such as the footprint 108 shown in FIG. 8 could be formed from beam patterns 110.

Please replace the paragraph on page 10, lines 32-34 to page 11, lines 1-9 with the following amended paragraph:

Referring to FIGs. 9 and 10, a third preferred embodiment in accordance with the present invention will now be discussed. Specifically, FIG. 9 shows two airplanes in an airborne cellular communications system, such as the planes 35, ~~35~~ 35′, performing a communications coverage handoff to ensure communications coverage within a geographic area such as the area 112. If, for example, the airplane 35 is executing its flight pattern and the weather center 38 determines that adverse weather, such as a thunderstorm 113 in FIG. 10, is moving into the area, the airplane ~~35~~ 35′ can take off from an airport, such as the airport 84 in FIG. 3, and ascend to a predetermined altitude. At this predetermined altitude, the airplanes 35, ~~35~~ 35′ project nearly-identical beam patterns 114, 116 onto the geographic area 112 to form a combination footprint 118. Therefore, both airplanes 35, ~~35~~ 35′ are providing communications links to system users on the ground.

Please replace the paragraph on page 11, lines 10-19 with the following amended paragraph:

As shown in FIG. 10, the two airplanes 35, ~~35~~ 35′ separate to allow the storm 113 to pass between the airplanes. Preferably, a gap 120 formed between the two airplanes 35, ~~35~~ 35′ is normal to the direction of the storm 113. Antenna angles for each of the airplanes 35, ~~35~~ 35′ are increased, but beam pattern signals due to beam pattern duplication are amplified at far-reaching beam locations at 122, thereby ensuring continued communications coverage in areas affected by the storm 113. This is because beam pattern signals need to penetrate less of the storm, as the signals radiate from the side of the storm rather than through it. In addition, the side lobe power of airplane antennas such as the antenna 70 in FIG. 2 can be increased to assure adequate link margins in such a situation.

Please replace the paragraph on page 10, lines 20-25 with the following amended paragraph:

When the storm 113 dissipates, the airplanes can return to flight pattern positions as shown in FIG. 9 so that nearly identical beam patterns are again formed. If the first airplane 35 is near completion of its mission, the second airplane ~~35~~ 35′ can then assume responsibility for the entire communications link, thereby enabling the airplane 35 to fly down to one of the airports 82, 84 for re-fueling, maintenance, crew change and the like.

Please replace the paragraph on page 11, lines 31-34 to page 12, lines 1-14 with the following amended paragraph:

Referring now to FIG. 11, additional communications switching between the two airplanes 35, ~~35~~ 35′ according to a fourth preferred embodiment in accordance with the present invention will now be discussed. Specifically, the primary communications link provided by

the airborne repeater must be switched from an existing plane executing a communications flight pattern to a subsequent plane taking the place of the current plane. This switchover must occur, however, in a seamless manner so as not to affect the underlying service. To effect such a transfer, for example, the airplane ~~35~~ 35′ takes off from one of the airports 82, 84 shown in FIG. 3 and ascends up to an altitude that is different than that of the airplane 35, while the airplane 35 continues to execute a clockwise communications coverage flight pattern 130. For example, as shown in FIG. 11, the altitude of the airplane ~~35~~ 35′ may be 1,000 feet higher than that of the airplane 35. At this predetermined altitude, the airplane ~~35~~ 35′ begins to execute its own clockwise flight pattern 132 that is similar in radius to, but slightly out of phase with, the flight pattern 130. Once the airplane ~~35~~ 35′ begins executing the flight pattern 132, either a ground control-directed communications switchover or a power control-directed switchover is initiated, each of which will now be described in more detail and each of which has no impact on system users.

Please replace the paragraph on page 11, lines 15-34 with the following amended paragraph:

Referring to the flow diagram in FIG. 12, ground control directed switchover of call traffic from one airplane to another will now be described. Specifically, at 140, a first plane, such as the plane 35, transmits a first communications beam pattern while executing a normal flight pattern 130 at a predetermined mission altitude, which is typically in a standard altitude range of, for example, 28,000 – 31,000 feet, and at a minimum loiter speed to maximize mission time. At 142, a second airplane, such as the airplane ~~35~~ 35′, flies up to a predetermined altitude and transmits a second communications beam pattern while executing a rendezvous flight pattern such as the flight pattern 132. At 144, after the second airplane initiates the rendezvous flight pattern, and attempts to approximately match the speed of the first airplane with a flight pattern phase offset of 180 degrees, it is determined at 146 whether the airplanes

are aligned within respective flight patterns, and therefore the corresponding beam patterns from the airplanes are overlapping, based on telemetry data from both of the airplanes. Alternatively, the technique may be designed to provide for call traffic switchover when: (a) the first and second airplanes are in parallel flight patterns at identical altitudes and separated by an FAA-approved offset distance; (b) the first and second planes are executing respectively an identical flight pattern but are 180 degrees out of phase; or (c) the first and second airplanes are executing separate flight patterns at different altitudes and in opposite directions.